

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

We Claim:

5 1. A method of releasing a glazing panel from a frame to
 which the panel is bonded by interposed bonding
 material, the method comprising:

 10 i) arranging light energy delivery means
 adjacent the glazing panel; and,

 ii) operating the light energy delivery means
 to transmit light energy through the
 glazing panel to effect ^{thermal} release of the
 glazing panel from the frame.

15 2. A method according to claim 1, wherein the light
 energy delivered is of a wavelength substantially in
 the range 300nm-1500nm.

20 3. A method according to claim 2, wherein the light
 energy delivered is of a wavelength substantially in
 the range 400nm-700nm.

25 4. A method according to claim 1, wherein the light
 energy delivered comprises a plurality of
 wavelengths.

30 5. A method according to claim 1, wherein the light
 energy attenuates significantly with distance, such
 that at a few centimetres from the energy delivery

means the light energy density is significantly diminished from its maximum value.

5 6. A method according to claim 5, wherein at a distance substantially in the range 5cm or less from the delivery means the light energy density is 50% maximum value, or below.

10 7. A method according to claim 1, wherein the light energy is non-coherent.

15 8. A method according to claim 1, wherein the light energy delivered is pulsed according to a predetermined regime.

20 9. A method according to claim 8, wherein the pulse duration (T_{on}) of a light pulse event is substantially in the range 1μs-1.00ms.

25 10. A method according to claim 9, wherein the pulse duration of a light pulse event is substantially in the range 1ms-2ms.

30 11. A method according to claim 1, wherein the pulse regime is controlled to inhibit a following light pulse event if the time elapsing after a preceding light pulse event is less than a predetermined time.

12. A method according to claim 1, wherein the pulse regime is controlled to inhibit a following light

Sub C
Sub P

10

15

20

25

30

pulse event if the time elapsing after a preceding light pulse event is greater than a predetermined time.

13. A method according to claim 1, wherein the pulse duration (T_{on}) is less than minimum permissible inter-pulse interval (T_{off}).

14. A method according to claim 8, wherein a single pulse of light energy delivered is of sufficient energy to effect separation of the screen from the frame along a length of the bonding material.

15. A method according to claim 1, wherein the light energy delivery means is hand held and positionable relative to the glazing manually by an operator.

16. A method according to claim 1, wherein the energy delivery means comprises electrical gas discharge apparatus.

17. A method according to claim 16, wherein operation of the gas discharge apparatus is controlled to limit the pulse rate and/or duration of the light pulse.

18. A method according to claim 17, wherein the operation of the gas discharge apparatus is controlled by:

- i) charging a capacitor arrangement;
- ii) initiating a trigger pulse to discharge the

capacitor arrangement; and,

iii) discharging the capacitor arrangement through an inductor to the gas discharge apparatus.

19. A method according to claim 17, wherein the gas discharge light emitting device is fed with a trickle/seepage current at times other than during a pulse event.

20. A method according to claim 19, wherein the trickle seepage current is monitored to provide an indication of the operability of the gas discharge light emitting device.

21. Apparatus for releasing a glazing panel from a frame to which the panel is bonded by interposed bonding material, the apparatus comprising light energy delivery means arrangeable adjacent the glazing panel, and operable to transmit light energy through the glazing panel to effect ^{thermal} release of the panel from the frame.

22. Apparatus according to claim 21, which is controllable to deliver the light energy in the form of a pulse of light.

23. Apparatus according to claim 21, wherein the apparatus includes control means to adjust and/or limit:

~~the pulse repetition rate of successive light pulse events; and/or,~~

~~the duration of a light pulse event; and/or,~~

~~the intensity of the light delivered.~~

10 24. Apparatus according to claim 21 including control means for controlling one or more apparatus parameters including the minimum permissible time elapsing between subsequent discharge pulses of the electrical gas discharge apparatus.

15 25. Apparatus according to claim 21, wherein the delivery means includes a manual trigger for initiating a light pulse when the delivery head is positioned to the operators satisfaction.

20 26. Apparatus according to claim 21, wherein the apparatus includes a safety interlock requiring at least two input devices to be actuated before light energy can be delivered from the delivery means.

25 27. Apparatus according to claim 26 including a delivery head from which the light energy is delivered, the delivery head including at least two input devices comprising the safety interlock, both input devices requiring actuation in order to enable light energy to be delivered from the delivery means.

30 28. Apparatus according to claim 26, wherein the input

devices comprise electrical input devices (such as
switch means).

B6
5

29. Apparatus according to claim 26, wherein following
actuation the input devices comprising the interlock
are reset to a non-actuation state.

10

30. Apparatus according to claim 21, wherein a controller
is provided for selectively adjusting the intensity
of the light delivered.

B6
B
15

31. Apparatus according to claim 21, wherein the
apparatus includes different preset settings which
may be switched to alter one or more parameters of
the light energy delivered, dependent upon the tint
of the glazing panel to be de-bonded or other
factors.

20

32. Apparatus according to claim 31, wherein adjustable
light energy parameters include:

light intensity; and/or,

pulse duration; and/or,

25

pulse interval.

B6
B
30

33. Apparatus according to claim 21, wherein the light
energy delivery means comprises electrical gas
discharge device.

5
g/a
B

10 34. Apparatus according to claim 33, wherein the electrical discharge device includes a light emitting discharge tube.

15 35. Apparatus according to claim 34, wherein the electrical gas discharge apparatus includes a pair of light emitting discharge tubes arranged in side by side relationship.

20 36. Apparatus according to claim 21, further comprising cooling means for cooling a light emitting element of the light energy delivery means.

25 37. Apparatus according to claim 36, wherein the cooling means comprises air cooling means such as an electrically operated fan.

30 38. Apparatus according to claim 33, including a pulse forming network having a capacitor and inductor arrangement in which the capacitor discharges through the inductor to drive the electrical gas discharge apparatus to produce a light pulse.

39. Apparatus according to claim 38, including a trigger network for initiating the capacitor of the pulse forming network to discharge.

40. Apparatus according to claim 21, wherein the apparatus includes a reflector arranged to direct emitted light in a predetermined direction.

SAC
SAC
C
20
SAC
SAC
30

10

15

20

25

30

41. Apparatus according to claim 21, wherein the apparatus comprises a window through which emitted light is directed to pass through the glazing panel.

42. Apparatus according to claim 21, wherein the apparatus comprises an edge guide arranged to locate against a running edge of the glazing panel.

43. Apparatus according to claim 21, wherein the apparatus comprises:

- 1) a light energy delivery head including an electrically operable light emitting element;
- ii) a base unit remote from the delivery head, the base unit including electrical power supply for the light emitting element of the delivery head; and,
- iii) a flexible umbilical extending between the base unit and the delivery head permitting connection of the delivery head to the base unit.

44. Apparatus according to claim 43, wherein the light emitting element of the delivery head comprises an electrical gas discharge light emitting device, the base unit including an electrical power arrangement having a capacitor for discharging through the electrical gas discharge light emitting device in the head via the umbilical.

10

15

20

25

30

10
B

25
B
11

30
10
B
11
add B¹³